GX3300 / GX3300C

Technical Manual

700060A

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ALLIED Vision Technologies

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For customers in the U.S.A.
(FCC Compliance Information)
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However there is no guarantee that interferences will not occur in a particular installation. Operation of this equipment in a residential environment is likely to cause harmful interference.

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Introduction

The GX3300 series of cameras are sensitive, 17 frames per second, 8 megapixel, Gigabit Ethernet cameras based on the Kodak KAI-08050 CCD sensor. These cameras support the use of 1 or 2 gigabit Ethernet ports in a LAG configuration for higher bandwidth requirements.

Precautions

READ INSTALLATION GUIDE CAREFULLY.

This document contains specific information which is necessary for the correct operation and treatment of this product.

DO NOT OPEN THE CAMERA. WARRANTY IS VOID IF CAMERA IS OPENED.

This camera contains sensitive components which can be damaged if handled incorrectly.

KEEP SHIPPING MATERIAL.

Poor packaging of this product can cause damage during shipping.

VERIFY ALL EXTERNAL CONNECTIONS.

Verify all external connections in terms of voltage levels, power requirements, voltage polarity, and signal integrity prior to powering this device.

CLEANING.

This product can be damaged by some volatile cleaning agents. Avoid cleaning the image sensor unless absolutely necessary. Please see instructions on sensor cleaning in this document.

DO NOT EXCEED ENVIRONMENTAL SPECIFICATIONS.

See environmental specifications limits in the Specifications section of this document.

Warranty

AVT Canada Inc. provides a 2 year warranty which covers the replacement and repair of all parts which are found to be defective in the normal use of this product. AVT Canada Inc. will not warranty parts which have been damaged through the obvious misuse of this product.

Specifications

Sensor Type	Kodak KAI-08050
Sensor Shutter Type	Progressive Interline
Image Resolution	3296 x 2472 pixels
Pixel Size	5.5µm x 5.5µm
Optical Format	4/3 inch
Lens Mount	F-mount with adjustable back focus
Color Sensor Filter Pattern†	Bayer
Full Resolution Frame Rate	17 fps
I/O	2 isolated inputs, 4 isolated outputs, RS-232 TX/RX, video auto-iris, motorized iris, focus, and zoom
Power Requirements	Less than 6.1W using a single Gige port Less than 7.2 W using 2 Gige ports
Digitization	14 Bits
Trigger latency*	1.5µs
Trigger Jitter*	±0.5µs
Operating Temperature	0 to 50 Celsius
Operating Humidity	20 to 80% non-condensing
Size and Weight	See mechanical diagrams
Hardware Interface Standard	IEEE 802.3 1000BASE-T, 100BASE-TX
Software Interface Standard	GigE Vision Standard 1.0
Regulatory	Conforms to CE, FCC, RoHS

† Applies to GX3300C only.

†† Power consumption will increase with reduced ROI imaging, vertical binning, and color formats.

* See Notes on Triggering in the Addendum.

*****DUE TO THE SMALL PACKAGING AND HIGH SPEED OF THE GX CAMERAS, SPECIAL CARE IS REQUIRED TO MAINTAIN A REASONABLE OPERATING TEMPERATURE. IF THE CAMERA IS TO BE OPERATED IN A WARM ENVIRONMENT, IT IS SUGGESTED THAT THE CAMERA BE MOUNTED ON A HEAT SINK SUCH AS A METAL BRACKET AND THAT THERE IS SUFFICIENT AIR FLOW.**

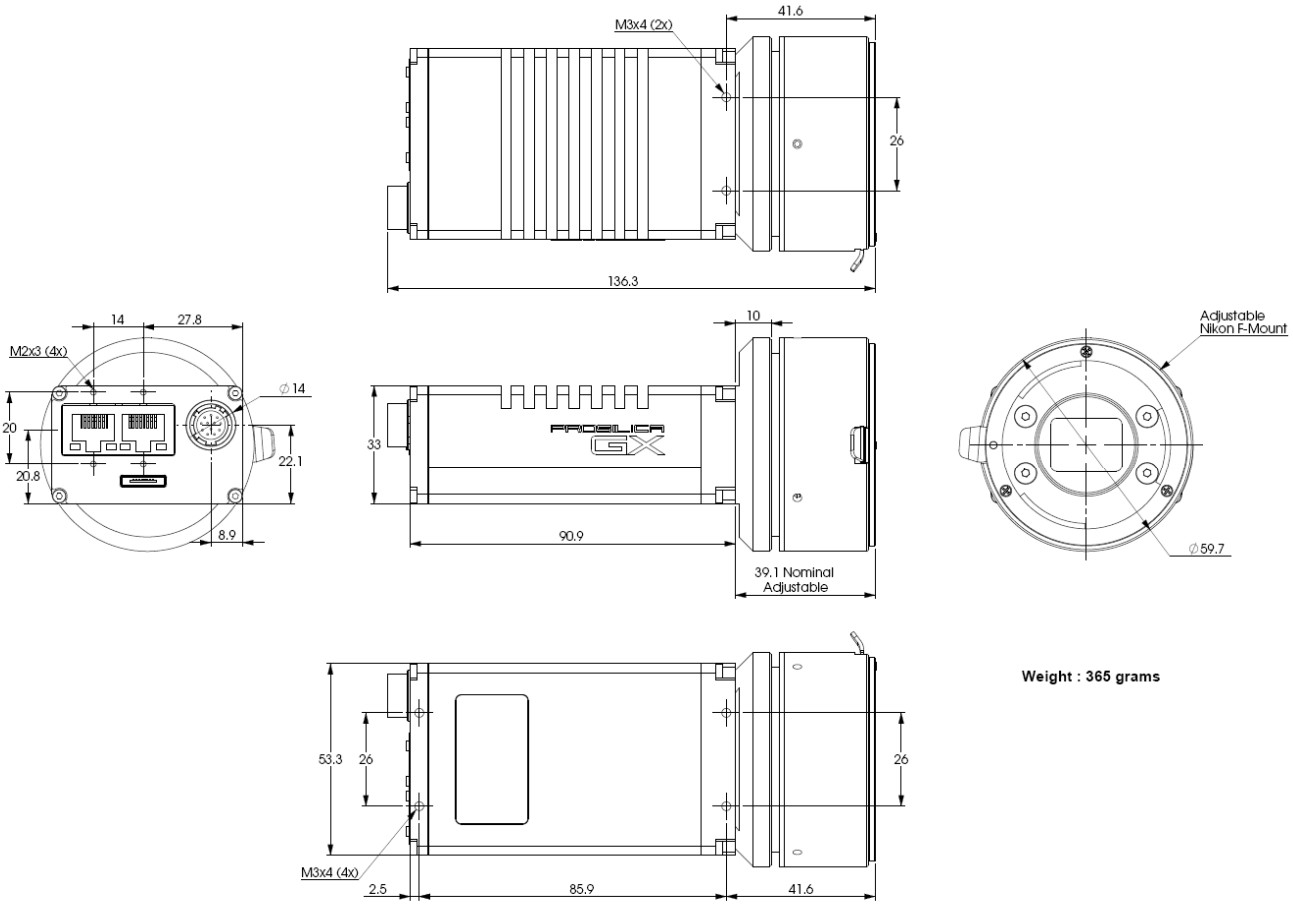
Supported Features

Imaging Modes	free-running, external trigger, fixed rate, software trigger
Fixed Rate Control	0.001 fps to maximum frame rate
External Trigger Delay	0 to 60 seconds in 1 microsecond increments
External Trigger Event	rising edge, falling edge, any edge, level high, level low
Exposure Time	10 microseconds to 60 seconds in 1 microsecond increments
Gain	0 to 34dB
Region of Interest (ROI)	independent x and y control with 1 pixel resolution***
Horizontal Binning	1 to 8 pixels
Vertical Binning	1 to 8 rows***
Pixel Formats	Mono8, Mono16*, Bayer8, Bayer16, RGB24, YUV411, YUV422, YUV444, BGR24, RGBA24, BGRA24
Sync Out Modes	trigger ready, trigger input, exposing, readout, imaging, strobe, GPO

*On monochrome versions only.

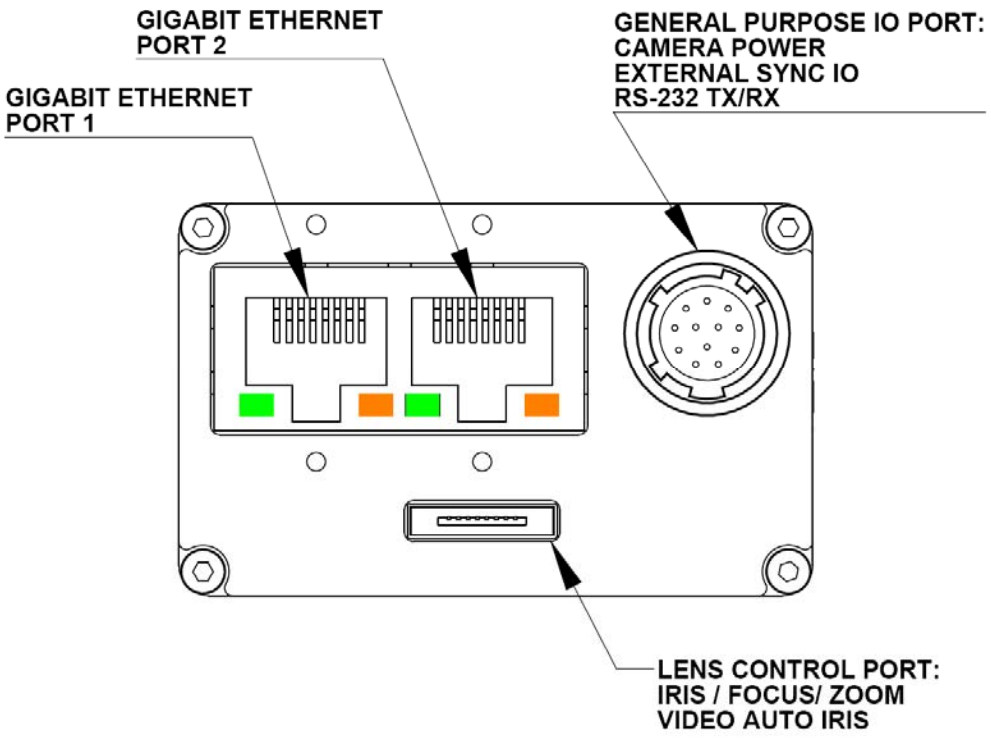
*****VERTICAL BINNING AND VERTICAL ROI CAN SIGNIFICANTLY INCREASE THE POWER CONSUMPTION OF THE CAMERA AND SHOULD ONLY BE USED INTERMITTENTLY AND WITH CAREFUL ATTENTION TO THE OPERATING TEMPERATURE OF THE CAMERA.**

Mechanical



GX F-MOUNT

Connections

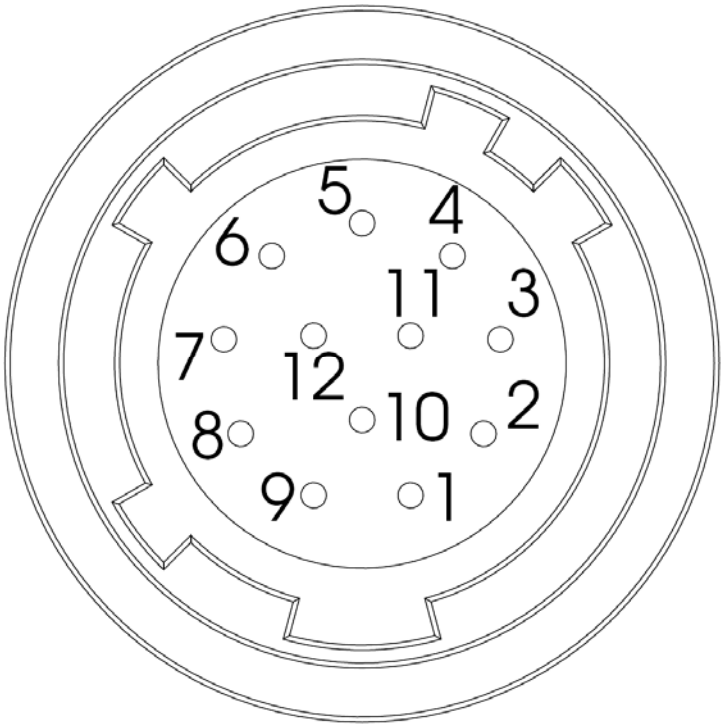


GX CONNECTION DIAGRAM

GIGABIT ETHERNET PORTS

These ports conform to the IEEE 802.3 1000BASE-T standard for Gigabit Ethernet over copper. It is recommended that CAT5E or CAT6 compatible cabling and connectors be used for best performance. Cable lengths up to 100m are supported. For higher bandwidth requirements, both ports can be used in a link aggregation group (LAG) configuration.

GENERAL PURPOSE IO PORT



GENERAL PURPOSE IO PORT AS SEEN FROM BACK OF CAMERA

PIN	FUNCTION
1	POWER GROUND
2	EXTERNAL POWER
3	SYNC OUT 4
4	SYNC IN 1
5	SYNC OUT 3
6	SYNC OUT 1
7	USER GROUND
8	RS-232 RXD
9	RS-232 TXD
10	USER VCC
11	SYNC IN 2
12	SYNC OUT 2

The General Purpose I/O port uses a Hirose HR10A-10R-12PB connector on the camera side. The mating cable connector is Hirose HR10A-10P-12S. This connector can be purchased from AVT Canada Inc. or from http://www.digikey.com. An open-ended cable assembly can also be ordered from AVT Canada Inc. (Part number 02-6033A).

See Addendum for more detail.

POWER GROUND

This is the main ground of the camera circuitry and will be the return path for the external power source. This connection must be provided to operate the camera. The conductor used for this connection must be adequate for the current consumption of the camera. For best performance the connection for POWER GROUND should be physically close to the EXTERNAL POWER connection.

EXTERNAL POWER

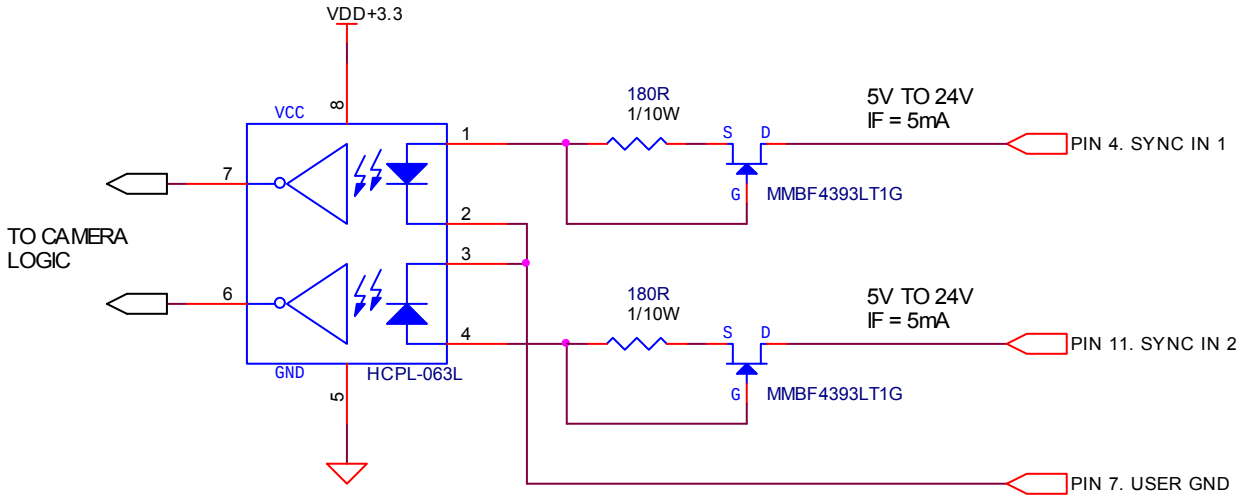
This connection provides the main power for the camera. The camera operates from a DC voltage between 5V to 24V. The current capacity of the power supply can be estimated by dividing the camera's power requirement by the external power voltage. It is also recommended to factor this by about 50% as follows:

Power supply current capacity = (power specification / external voltage) x 1.5

The conductor used for this connection must be adequate for the current consumption of the camera. For best performance the connection for *EXTERNAL POWER* should be physically close to the *POWER GROUND* connection.

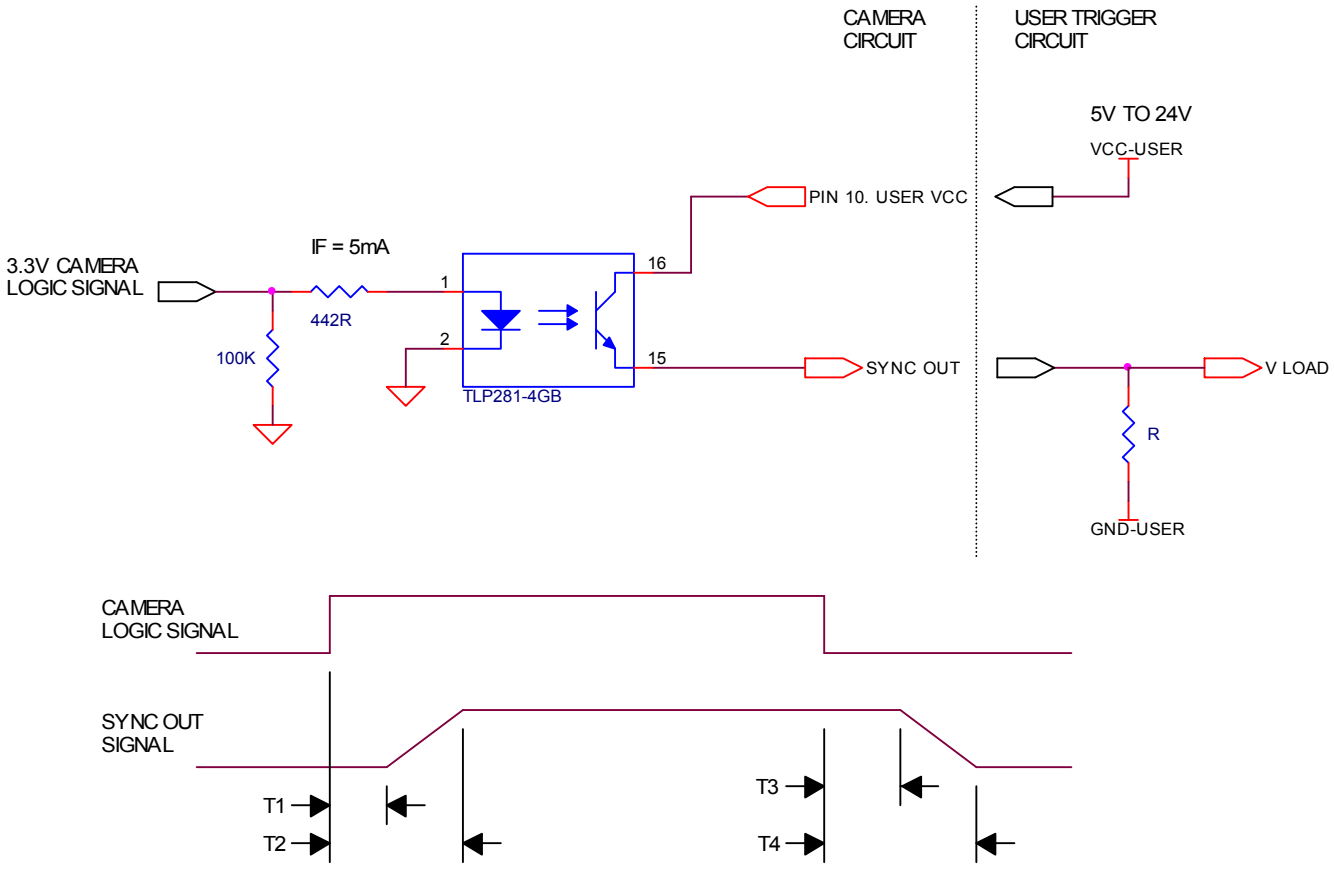
SYNC INPUTS (1 and 2)

The input signals allow the camera to be synchronized to some external event. These signals are optically isolated and require the signal common (*USER GROUND*). The camera can be programmed to trigger on the rising or falling edge of these signals. The camera can also be programmed to capture an image at some programmable delay time after the trigger event. These signals can be driven from 5V to 24V with a current load of 5mA.



SYNC OUTPUTS (1 to 4)

These signals are optically isolated and require the user to provide a high voltage level (*USER VCC*) and signal common (*USER GROUND*). USER VCC can be from 5V to 24V. ICC is a function of USER VCC and load resistor R. An example of the functional circuit is indicated in the following diagram.



Various USER VCC values and load values for the above circuit are indicated in the following table:

USER VCC	USER ICC	R LOAD	V LOAD	R POWER DISSIPATION	T1	T2	T3	T4
5V	8mA	500Ω	4.1V	32mW	1.5µs	6.5µs	2µs	14µs
5V	4.8mA	1KΩ	4.8V	23mW	1.5µs	5µs	17µs	40µs
12V	9.2mA	1.2KΩ	11.2V	101mW	1.5µs	11.2µs	2µs	20µs
12V	4.9mA	2.4KΩ	11.8V	58mW	1.5µs	8.5µs	17µs	55µs
24V	9.5mA	2.4KΩ	23.2V	217mW	1.5µs	22µs	2µs	37µs
24V	5mA	4.8KΩ	23.8V	120mW	1.5µs	12µs	17µs	105µs

These signals only function as outputs and can be configured as follows:

Exposing	Corresponds to when camera is integrating light.
Trigger Ready	Indicates when the camera will accept a trigger signal.
Trigger Input	A relay of the trigger input signal used to "daisy chain" the trigger signal for multiple cameras.
Readout	Valid when camera is reading out data.
Strobe	Programmable pulse based on one of the above events.
Imaging	Valid when camera is exposing or reading out.
GPO	User programmable binary output.

Any of the above signals can be set for active high or active low.

RS-232 RXD and RS-232 TXD

These signals are RS-232 compatible. These signals allow communication from the host system via the Ethernet port to a peripheral device connected to the camera. These signals are not optically isolated and reference power ground. If these signals are used in the system, care must be taken to prevent ground loop problems.

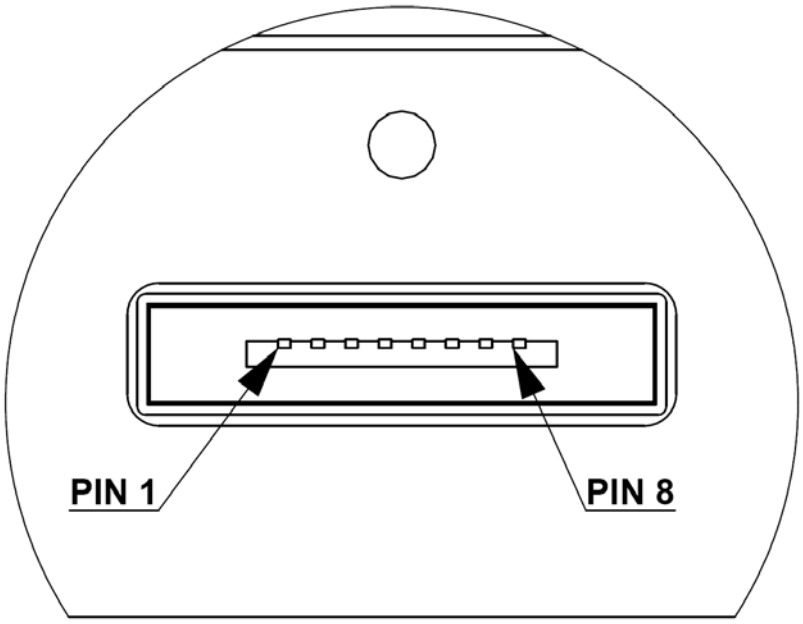
USER GROUND

This connection provides the user ground reference and return path for the isolated sync in and sync out signals. This connection is necessary if any of the isolated sync signals are to be used. It is also recommended that this ground connection be physically close to the used sync signals to prevent parasitic coupling. For example, a good cable design would connect the required signal on one conductor of a twisted pair and the isolated ground on the second conductor of the same twisted pair.

USER VCC

This connection provides the power supply for the isolated sync out signals. The voltage requirement is from 5V to 24V DC. The current requirement for this supply is a function of the optical isolator collector current and the number of sync outs used in the system. See the ***SYNC OUTPUT*** section for more detail. To prevent parasitic coupling this connection should be physically close to the used *SYNC OUT* signals and *USER GROUND*.

LENS CONTROL PORT



PIN	FUNCTION
1	IRIS +
2	IRIS -
3	FOCUS +
4	FOCUS -
5	ZOOM +
6	ZOOM -
7	AUTO IRIS SIGNAL
8	GROUND

LENS CONTROL PORT AS SEEN FROM BACK OF CAMERA

This connector provides the signals necessary to control the iris, focus, and zoom of most commercially available TV Zoom lenses. The camera can be configured to operate lenses with unipolar voltage requirements of 6V up to 12V or lenses which operate with bipolar voltages from ±6V up to ±12V. This voltage level can be controlled through software. The default voltage will be set to 6V. The current capacity for each axis is 50mA.

CARE MUST BE TAKEN NOT TO EXCEED THE LENS MANUFACTURERS VOLTAGE SPECIFICATION.

This connector also provides the signals necessary to operate a video auto iris type of lens.

The lens control connector is a Hirose 3260-8S3. The mating cable connector is Hirose 3240-8P-C(50). This connector can be purchased from AVT Canada Inc. or from http://www.digikey.com.

See Addendum for more detail.

Cleaning the Sensor

DO NOT CONTACT CLEAN SENSOR UNLESS ABSOLUTELY NECESSARY.

Identifying Debris

Debris on the image sensor or optical components will appear as a darkened area or smudge on the image that does not move as the camera is moved. Do not confuse this with a pixel defect which will appear as a distinct point.

Locating Debris

Before attempting to clean the image sensor, it is important to first determine that the problem is due to debris on the sensor window. To do this you should be viewing a uniform image, such as a piece of paper, with the camera. Debris will appear as a dark spot or dark region that does not move as the camera is moved. To determine that the debris is not on the camera lens, rotate the lens independent of the camera. If the spot moves as the lens moves, then the object is on the lens -not on the image sensor- and therefore cleaning is not required. If the camera has an IR filter, then rotate the IR filter. If the object moves then the particle is on the IR filter not the sensor. If this is the case remove the IR filter carefully using a small flat head screw driver. Clean both sides of the IR filter using the same techniques as explained below for the sensor window.

DO NOT TOUCH ANY OPTICS WITH FINGERS. OIL FROM FINGERS CAN DAMAGE FRAGILE OPTICAL COATINGS.

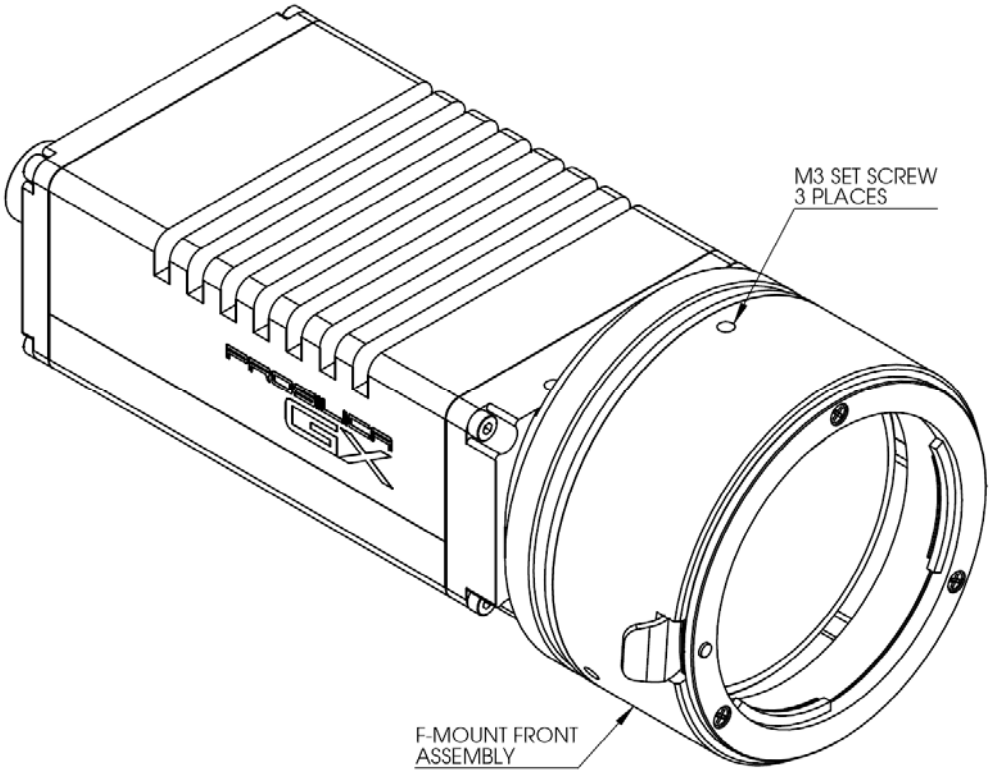
Cleaning with Air

If it is determined that debris is on the sensor window, then remove the camera lens, and blow the sensor window directly with clean compressed air. If canned air is used, do not shake or tilt the can prior to blowing the sensor. View a live image with the camera after blowing. If the debris is still there, repeat this process. Repeat the process a number of times with increased intensity until it is determined that the particulate cannot be dislodged. If this is the case then proceed to the contact cleaning technique.

Contact Cleaning

Only use this method as a last resort. Use 99% laboratory quality isopropyl alcohol and clean cotton swabs. Dampen the swab in the alcohol and gently wipe the sensor in a single stroke. Do not reuse the same swab. Do not wipe the sensor if the sensor and swab are both dry. You must wipe the sensor quickly after immersion in the alcohol, or glue from the swab will contaminate the sensor window. Repeat this process until the debris is gone. If this process fails to remove the debris, then contact AVT Canada Inc.

Adjusting the F-mount



THE F-MOUNT IS ADJUSTED AT THE FACTORY AND SHOULD NOT REQUIRE ADJUSTING.

If for some reason, the F-mount requires adjustment, use the following method.

Attach F-mount compatible lens

Use an F-mount compatible lens that allows an infinity focus. Attach the lens to the camera using a counter-clockwise rotation of about a quarter turn. The lens should snap into place and the lens flange and camera flange should mate over the full circumference.

Loosen F-MOUNT FRONT ASSEMBLY

Use a 1.5mm hex wrench to loosen the 3 set screws which hold the F-mount front assembly to the camera body.

Image to Infinity

Set the lens to infinity and image a distant object. The distance required will depend on the lens used but typically 30 to 50 feet should suffice. Gently move the F-mount front assembly until the image is in focus. Carefully tighten the 3 set screws. Recheck the focus.

Network Card Configuration

Operating GigE Vision GX cameras using multiple network adaptors

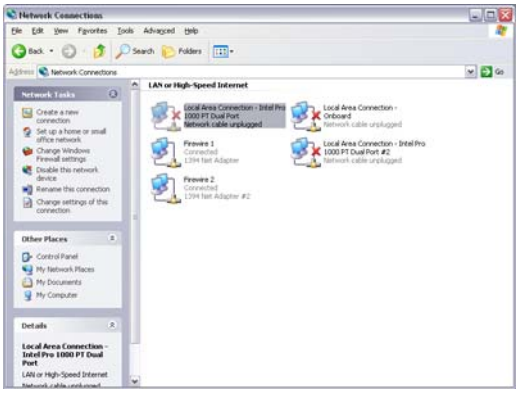
The GX series cameras offer two Gigabit Ethernet ports for image data transfer and control. Users can connect one or both ports on the GX to Ethernet adapter ports on a host computer. Connecting both ports will increase the available bandwidth to 240 MB/sec, allowing higher frame rates and resolutions than a single port connection.

GX cameras can be operated in single port and dual port configurations. The dual port approach requires the host computer to configure a Link Aggregate Group (LAG). A LAG configuration combines multiple Ethernet ports into a single data channel.

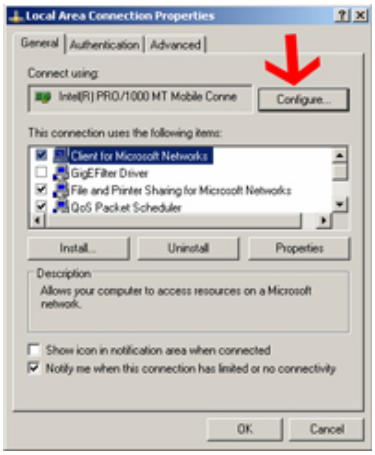
1. Install a dual port network card in the host computer. To achieve full camera performance, you should use a Gigabit Ethernet card that supports "Jumbo frames" of at least 9KB size.

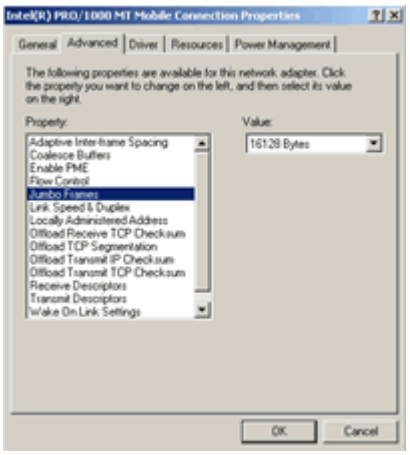
2. Once installed, open your "Network Connections" (Start -> Control Panel->Network Connections) and right-click on one of the two network connection corresponding to the card that was just installed.

3. Select "Properties" from the contextual menu that appears when you right click the network connection icon. This will open the properties window.



4. In the properties window, click the "Configure" button. Select the "Advanced" tab. In the "Property" list make the following changes:
   (a) select "Jumbo Frames" and change the value to 9014 bytes or higher.
   (b) select "Receive Descriptors" on the same list and change the value to 512
   (c) select "Performance Options" and set "Interrupt Moderate Rate" to "Extreme"





5. Click on “OK” to validate your change (the “Properties” window will close). The Property list will be different between different types/brands of gigabit Ethernet interface cards. If "Jumbo Frames" does not appear in this list, then your card probably does not support it. If your card does not support Jumbo Frames, then your CPU usage will be higher.

6. Re-open the "Properties" of the PRO/1000 GT adapter by right-clicking the Local Area Connection "Intel® PRO/1000 GT" network connection icon in the Network Connections window and select the "Advanced" tab at the top of the Properties dialog.

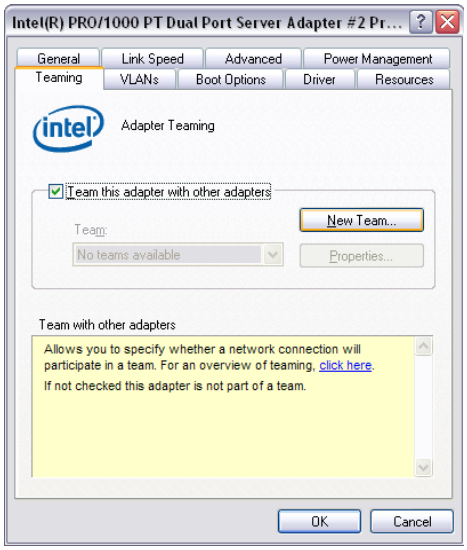
7. In the "Windows Firewall" section, select "Settings". In the Settings dialog choose "Off" to turn off the Windows firewall. The camera will not work if the firewall is active. If you installed the AVT/Prosilica GigE filter driver, this step is not required.

Windows Firewall
General
Exceptions
Advanced
Your PC is not protected: turn on Windows Firewall
Windows Firewall helps protect your computer by preventing unauthorized users from gaining access to your computer through the Internet or a network.
On (recommended)
This setting blocks all outside sources from connecting to this computer, with the exception of those selected on the Exceptions tab.
Don't allow exceptions
Select this when you connect to public networks in less secure locations, such as airports. You will not be notified when Windows Firewall blocks programs. Selections on the Exceptions tab will be ignored.
Off (not recommended)
Avoid using this setting. Turning off Windows Firewall may make this computer more vulnerable to viruses and intruders.
What else should I know about Windows Firewall?
OK
Cancel

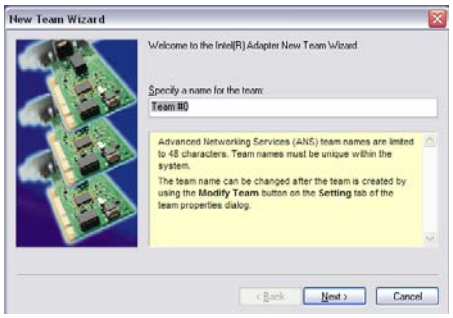
8. Perform Steps 1 – 8 for the other Ethernet adapter port that will be dedicated to the GX camera network.

9. The next section will provide instructions for configuring the Link Aggregate Group (LAG) to combine the two ports dedicated to the GX network.
Open your “Network Connections” (Start -> Control Panel->Network Connections) and right-click on one of the two network connection corresponding to the card that was just installed. Select “Properties” from the contextual menu that appears when you right click the network connection icon. This will open the properties window. In the properties window, click on “Configure” button in order to create a Link Aggregate Group (LAG) between the two ports.

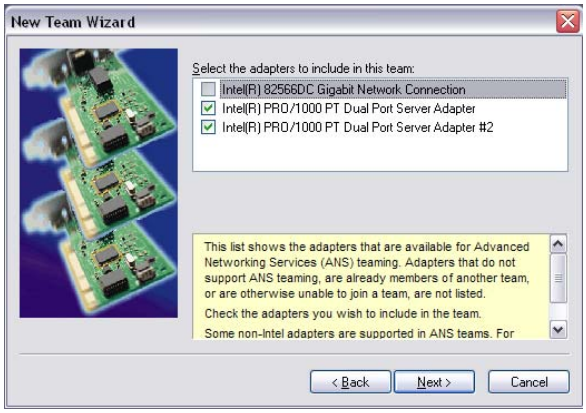
10. Select the “Teaming” tab (analogous to LAG), enable “Team this adapter with other adapters and click on the “New Team” button.



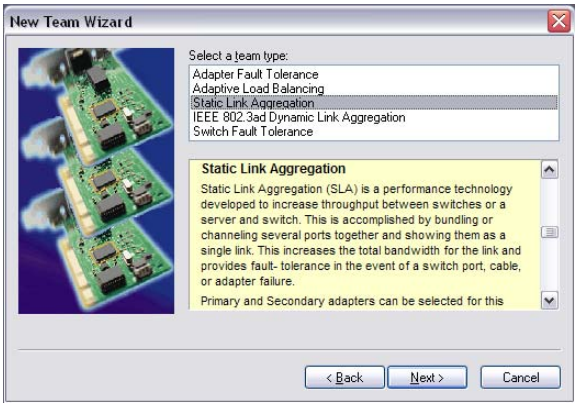
11. Specify a name for the Team (Link Aggregate Group). This should be something that will distinguish this adapter from others in your system. Click “Next” to continue.


New Team Wizard
Welcome to the Intel(R) Adapter New Team Wizard
Specify a name for the team:
Team #0
Advanced Networking Services (ANS) team names are limited to 48 characters. Team names must be unique within the system.
The team name can be changed after the team is created by using the Modify Team button on the Setting tab of the team properties dialog.
< Back
Next >
Cancel

12. Select the two Ethernet ports to which the GX camera will be connected. These ports will form our LAG or TEAM. Click "Next" to continue.


New Team Wizard
Select the adapters to include in this team:
Intel(R) 82566DC Gigabit Network Connection
Intel(R) PRO/1000 PT Dual Port Server Adapter
Intel(R) PRO/1000 PT Dual Port Server Adapter #2
This list shows the adapters that are available for Advanced Networking Services (ANS) teaming. Adapters that do not support ANS teaming, are already members of another team, or are otherwise unable to join a team, are not listed.
Check the adapters you wish to include in the team.
Some non-Intel adapters are supported in ANS teams. For
< Back
Next >
Cancel

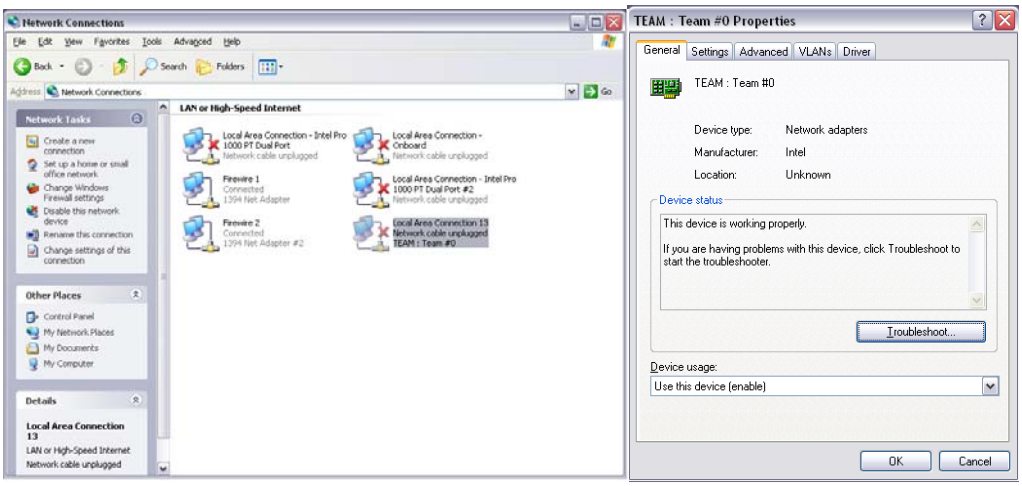
13. Choose "Static Link Aggregation". Click "Next" to continue.


New Team Wizard
Select a team type:
Adapter Fault Tolerance
Adaptive Load Balancing
Static Link Aggregation
IEEE 802.3ad Dynamic Link Aggregation
Switch Fault Tolerance
Static Link Aggregation
Static Link Aggregation (SLA) is a performance technology developed to increase throughput between switches or a server and switch. This is accomplished by bundling or channeling several ports together and showing them as a single link. This increases the total bandwidth for the link and provides fault- tolerance in the event of a switch port, cable, or adapter failure.
Primary and Secondary adapters can be selected for this
< Back
Next >
Cancel

14. The LAG group will now be configured. You may be asked to permit the "AVT_Prosilica GigE Vision Filter Miniport" installation on the new LAG adapter. Click "Continue Anyway".

New Team Wizard
Hardware Installation
The software you are installing for this hardware:
AVT_Prosilica GigE Vision Filter Miniport
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

15. Once completed the properties of the TEAM (LAG) that has just been created will appear. A new Network Connections Icon corresponding to the LAG group is created. You have now completed the Link Aggregate Group configuration.



16. Reboot the system and install GigE Sample Viewer.

GigE Sample Viewer and Filter Driver

- Download GigE Sample Viewer from www.alliedvisiontec.com. This will install the Sample Viewer application program, drivers, and optionally the AVT/Prosilica Filter Driver. The Filter Driver will improve CPU performance and is recommended.
- Plug in the GX camera Ethernet cable(s) and power. Verify that the Green LED is a solid green. Run Sample Viewer. It will take a few seconds for the camera to be recognized, especially if your camera is in DHCP mode. If the camera does not appear after one minute, see the Trouble Shooting section of this document.
- In Sample Viewer, select the ***wrench*** icon to change camera settings. See the Camera Controls Addendum for description of each setting. Select the ***eye*** icon to stream images. If the camera is not imaging, see the Trouble Shooting section of this document.

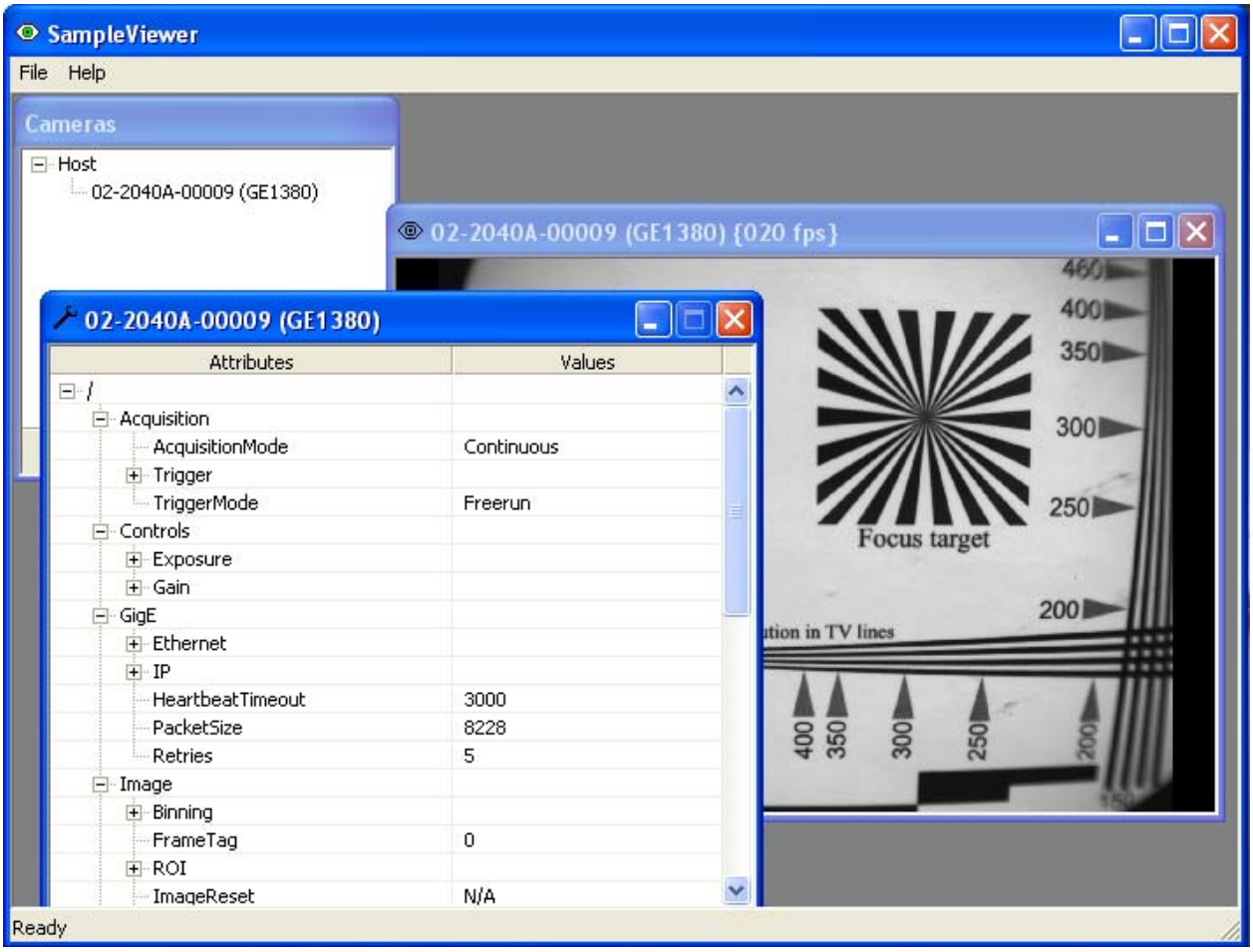


Figure 1. GigE Viewer application window.

Trouble Shooting

Is the camera getting power?

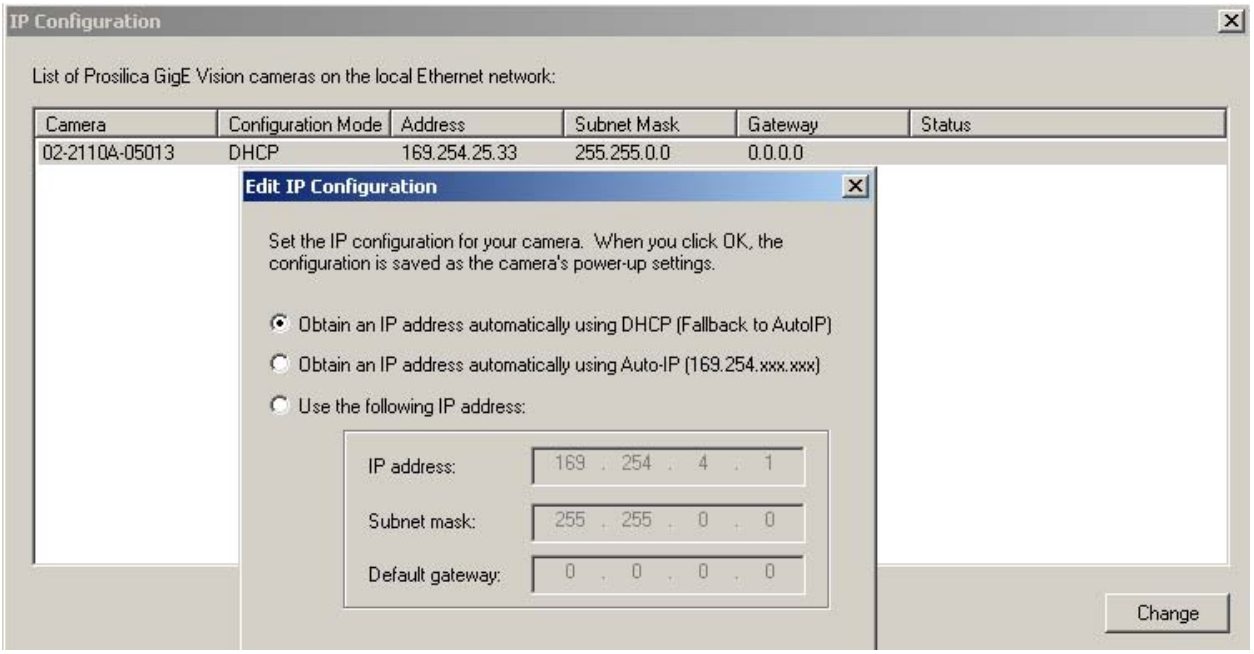
The Green LED is the camera power indicator. If unlit, check the power adaptor. If possible, swap with one that is known to work. If using a custom power adaptor, be sure the adaptor supports the voltage and power requirements of the camera . If the LED still does not light up, contact AVT Canada Inc. support.

Is the camera powered, but not detected in SampleViewer?

Damaged or poor quality Ethernet cabling can result in no cameras found, dropped packets, decreased bandwidth, and other problems. Use Cat5e or better cabling known to work.

Configure your NIC as outlined in "Gigabit Ethernet Setup For Windows". It should have an IP address of 169.254.x.x, Subnet Mask: 255.255.0.0. This is the AutoIP address range. If your NIC has no access to a DHCP server, the camera will still be auto assigned an IP address. There should be no gateway on your NIC.

Connect a single camera directly to your NIC, no hub/switch, and run the prosilica IP Configuration utility (Start>Programs>Prosilica>GigEIPConfig or C:\Program Files\Prosilica\GigEViewer\ipconfig.exe). You may need to wait up to 30 sec for camera to appear.


IP Configuration
List of Prosilica GigE Vision cameras on the local Ethernet network:
Camera
Configuration Mode
Address
Subnet Mask
Gateway
Status
02-2110A-05013
DHCP
169.254.25.33
255.255.0.0
0.0.0.0
Edit IP Configuration
Set the IP configuration for your camera. When you click OK, the configuration is saved as the camera's power-up settings.
Obtain an IP address automatically using DHCP (Fallback to AutoIP)
Obtain an IP address automatically using Auto-IP (169.254.xxx.xxx)
Use the following IP address:
IP address:
169 . 254 . 4 . 1
Subnet mask:
255 . 255 . 0 . 0
Default gateway:
0 . 0 . 0 . 0
Change

A camera in DHCP (AutoIP fallback) mode.

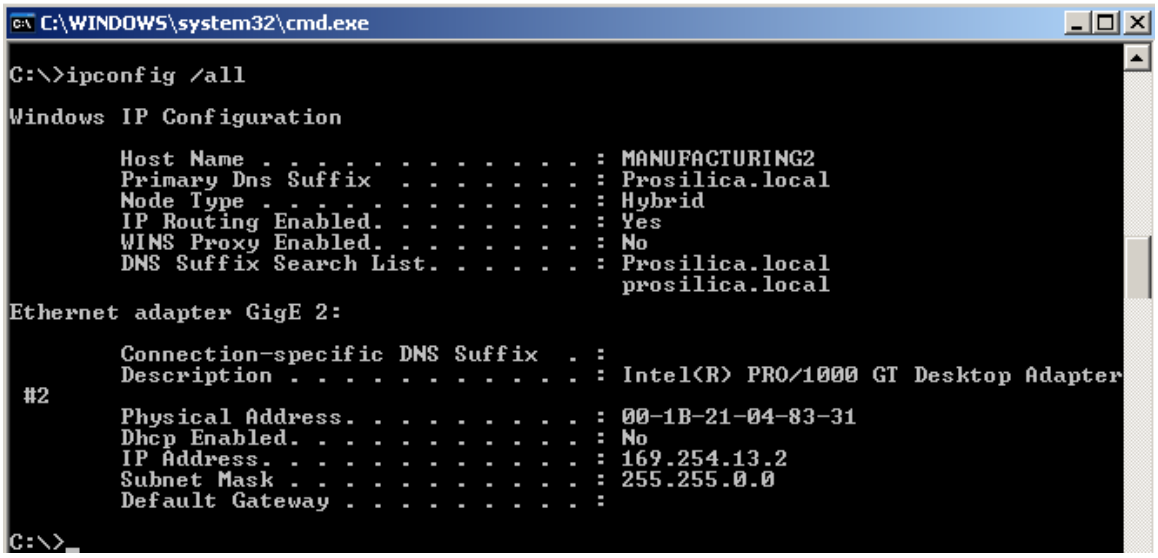
- Camera is listed: Your camera and NIC must be on the same subnet, e.g.: NIC: IP **169.254**.23.2 Subnet Mask: 255.255.0.0, Camera IP: **169.254**.43.3 Subnet Mask: 255.255.0.0.

The following example is not on the same Subnet: NIC IP **169.250.**23.2 Subnet Mask: 255.255.255.0, CamIP **169.254.**13.0 Subnet Mask: 255.255.0.0. This can happen if you use a

non AutoIP range on your NIC and it doesn't have access to a DHCP server. Either change your NIC IP to be in the AutoIP range, or fix the camera IP address to be on the same subnet as your NIC.

- Camera is not listed, or flashing "Camera Unavailable": There may be multiple NICs on your system set to the same subnet. The camera can not know which card to resolve to. Change the IP address of your NIC.

If you are still having problems, type: ipconfig /all in a windows command prompt, and send a screenshot to support@alliedvisiontec.com.

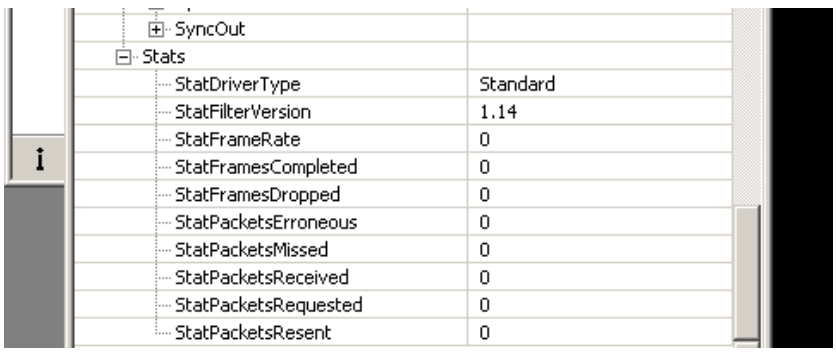

C:\WINDOWS\system32\cmd.exe
C:\>ipconfig /all
Windows IP Configuration
Host Name . . . . . : MANUFACTURING2
Primary Dns Suffix . . . . . : Prosilica.local
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : Yes
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : Prosilica.local
prosilica.local
Ethernet adapter GigE 2:
Connection-specific DNS Suffix . :
Description . . . . . : Intel(R) PRO/1000 GT Desktop Adapter
#2
Physical Address. . . . . : 00-1B-21-04-83-31
Dhcp Enabled. . . . . : No
IP Address. . . . . : 169.254.13.2
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . :
C:\>

Ipconfig /all screenshot

Is the camera listed in SampleViewer but can't acquire images?

Reset your camera settings to factory default: with ConfigFileIndex = Factory, click the ConfigFileLoad button.

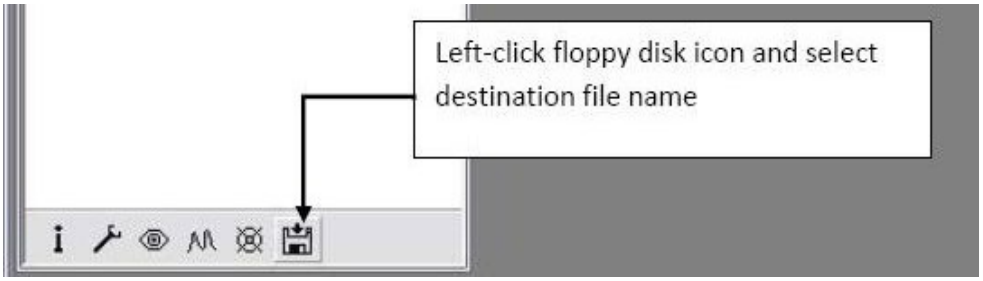
While streaming, check your Stats:



All stats 0 while streaming. Firewall likely blocking traffic

- All stats 0. Likely a firewall is blocking incoming traffic. Disable your firewall. Check your camera trigger settings. Many camera trigger modes require a software or hardware trigger event to capture frames.
- Packets are incoming, but all dropping. Be sure you have JumboFrames enabled on your NIC. Otherwise, decrease your PacketSize setting to 1500.
- All packets completing as normal, but black image. Check ExposureValue, ExposureMode, and be sure your scene is suitably lit.

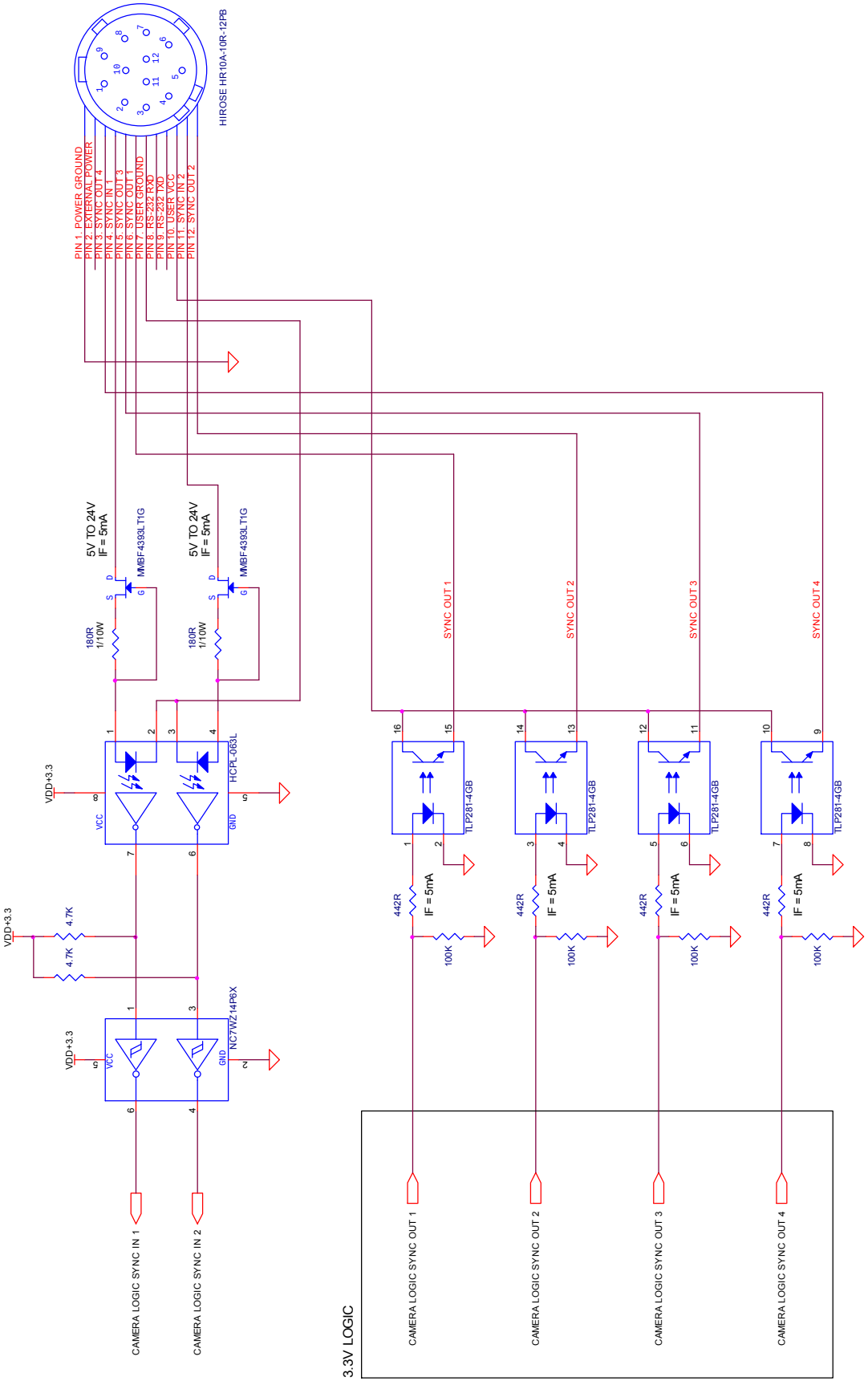
If you are still having problems acquiring images, please send your camera settings file (click on the disk icon in SampleViewer) to support@alliedvisiontec.com.



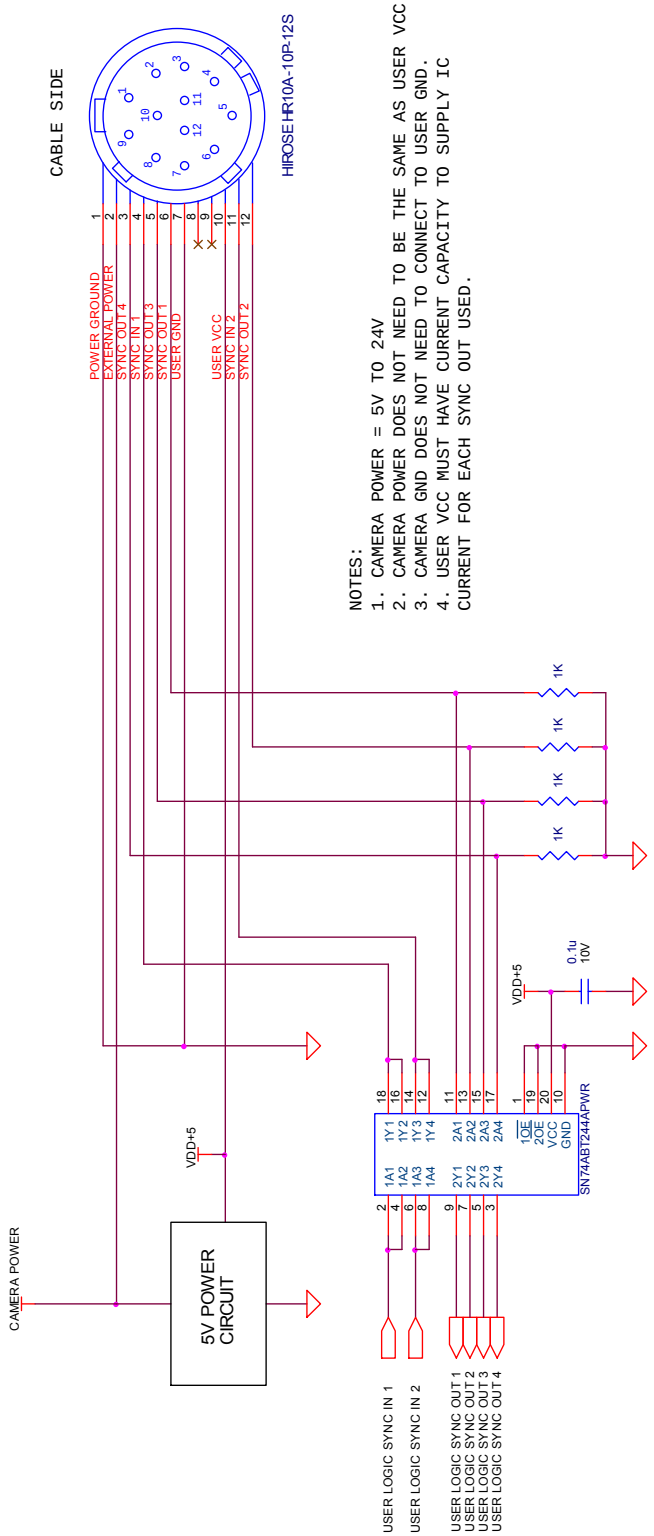
Saving camera setting file

Addendum

GX IO Schematic

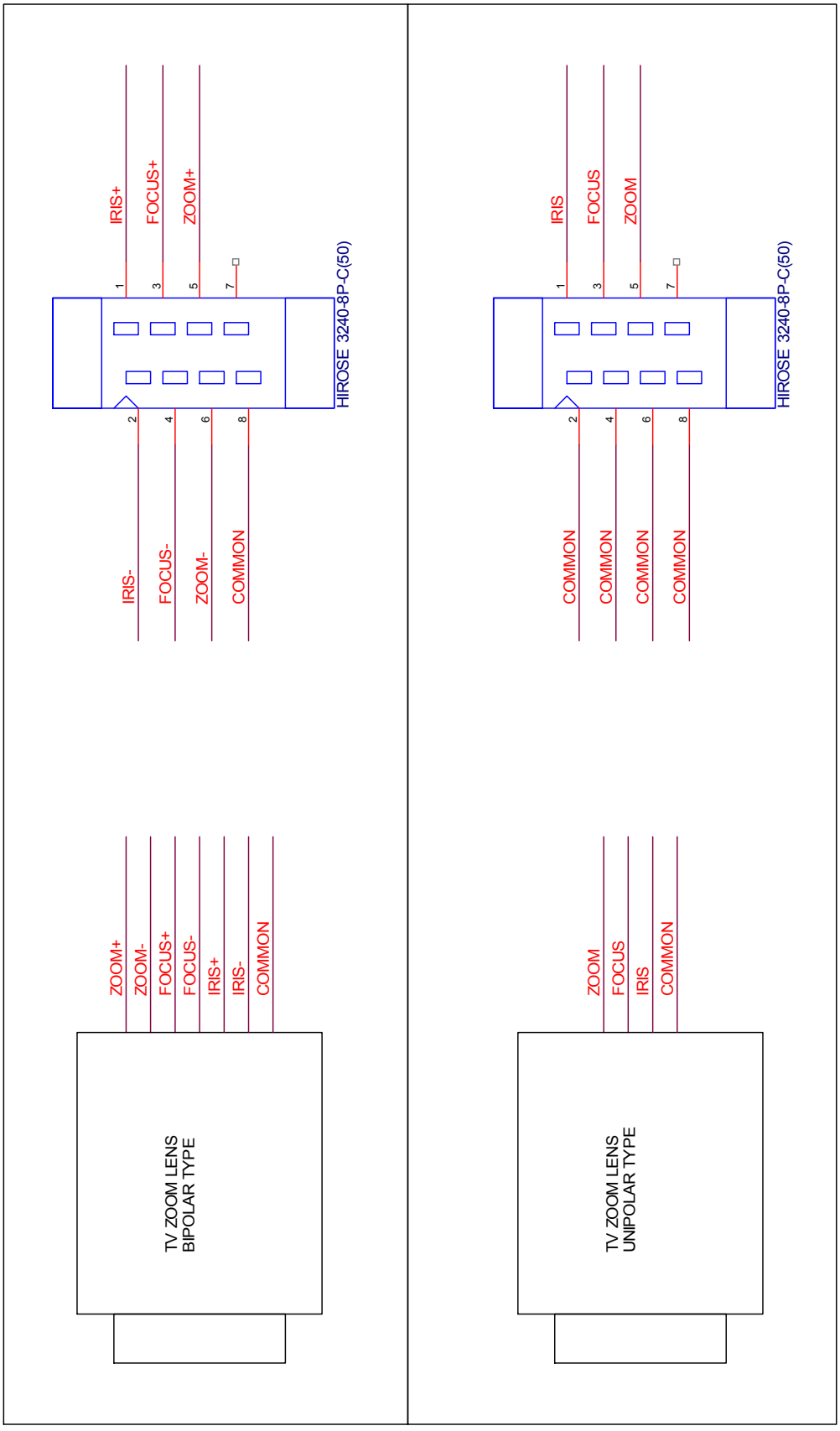


User Trigger Circuit Example



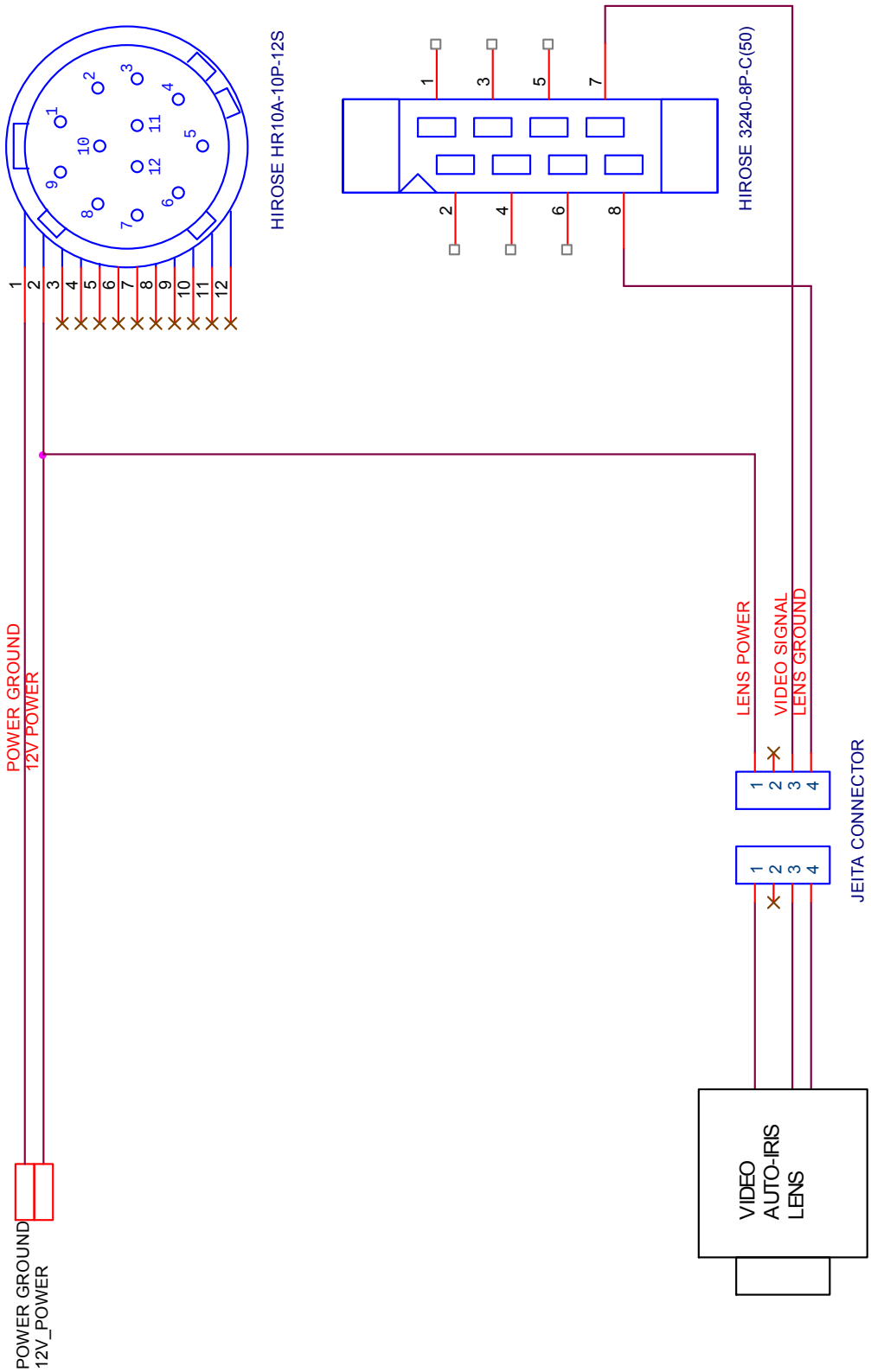
This diagram indicates one example of a 5V TTL based user trigger circuit.

TV Zoom Lens Connection

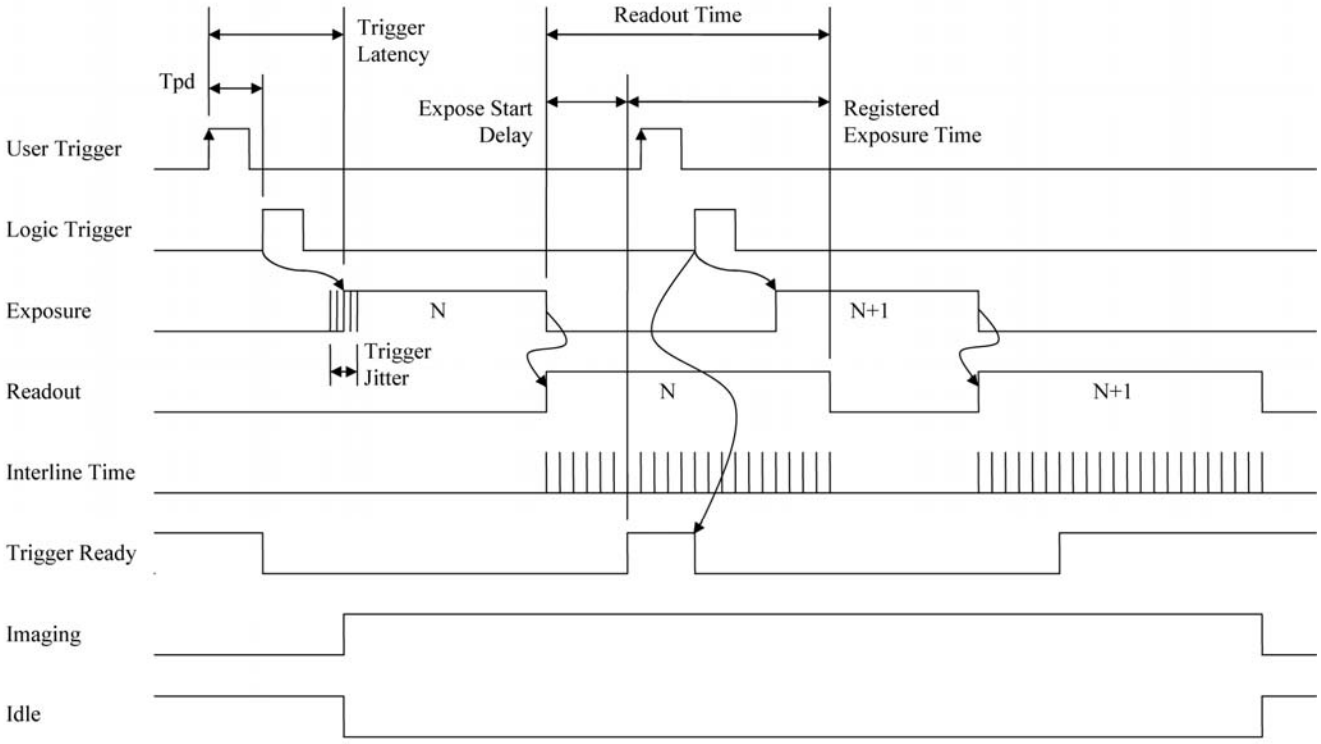


NOTES:
1. CURRENT CAPACITY PER AXIS = 50mA.
2. VERIFY LENS VOLTAGE SETTING ON CAMERA DOES NOT EXCEED LENS VOLTAGE SPECIFICATION.

Video Iris Connection



Trigger Timing Diagram



Notes on Triggering

Definitions

- User Trigger is the trigger signal applied by the user.
- Logic Trigger is the trigger signal seen by the camera internal logic.
- Tpd is the propagation delay between the User Trigger and the Logic Trigger.
- Exposure is high when the camera image sensor is integrating light.
- Readout is high when the camera image sensor is reading out data.
- Trigger Latency is the time delay between the User Trigger and the start of Exposure.
- Trigger Jitter is the error in the Trigger Latency time.
- Trigger Ready indicates to the user that the camera will accept the next trigger.
- Registered Exposure Time is the Exposure Time value currently stored in the camera memory.
- Expose Start Delay is the delay time from the start of Exposure to valid Trigger Ready. It is the Registered Exposure Time subtracted from the Readout time and indicates when the next Exposure cycle can begin such that the Exposure will end after the current Readout.
- Interline Time is the time between sensor row readout cycles.
- Imaging is high when the camera image sensor is either exposing and/or reading out data.
- Idle is high if the camera image sensor is not exposing and/or reading out data.

Rules

- The User Trigger pulse width should be at least three times the width of the Trigger Latency as indicated in the Specifications section of this document.
- The end of Exposure will always trigger the next Readout.
- The end of Exposure must always end after the current Readout.
- The start of Exposure must always correspond with the Interline Time if Readout is true.
- Expose Start Delay equals the Readout time minus the Registered Exposure Time.

Triggering during the Idle State

- For applications requiring the shortest possible Trigger Latency and the smallest possible Trigger Jitter the User Trigger signal should be applied when Imaging is false and Idle is true.
- In this case, Trigger Latency and Trigger Jitter are as indicated in the Specifications section.

Triggering during the Readout State

- For applications requiring the fastest triggering cycle time whereby the camera image sensor is exposing and reading out simultaneously, then the User Trigger signal should be applied as soon as a valid Trigger Ready is detected.
- In this case, Trigger Latency and Trigger Jitter can be up to 1 line time since Exposure must always begin on an Interline boundary.

Camera Controls

Note: Not all features listed here are available on all camera models.

Acquisition

This group of controls relates to the acquiring of images.

Trigger

This group of controls relates to how an image frame is initiated or triggered.

AcqEnd

AcqEndTriggerEvent – What type of external input trigger will end acquisition.

EdgeRising – rising edge trigger
EdgeFalling – falling edge trigger
EdgeAny – rising or falling edge
LevelHigh – active high signal
LevelLow – active low signal

AcqEndTriggerMode – Selects if the end of acquisition should be stimulated by an external hardware trigger. See the AcquisitionStop command for software triggering.

SyncIn1 – trigger at SyncIn1 to be associated with this control
SyncIn2 – trigger at SyncIn2 to be associated with this control
Disabled – an external trigger does not control end of acquisition

AcqRec

An AcqStart hardware trigger signal, or the AcquisitionStart command, must be received before your AcqRec trigger. See AcquisitionMode = Recorder.

AcqRecTriggerEvent – What kind of external input trigger will start a recording sequence when AcquisitionMode set to Recorder.

EdgeRising – rising edge trigger
EdgeFalling – falling edge trigger
EdgeAny – rising or falling edge
LevelHigh – active high signal
LevelLow – active low signal

AcqRecTriggerMode – Selects if the start of a Recorder event should be stimulated by an external hardware trigger. There is no software trigger event capability for this mode.

SyncIn1 – trigger at SyncIn1 to be associated with this control
SyncIn2 – trigger at SyncIn2 to be associated with this control
Disabled – an external trigger does not control the start of a Recorder event

AcqStart

AcqStartTriggerEvent – What kind of external input trigger will stimulate the start of acquisition.

EdgeRising – rising edge trigger
EdgeFalling – falling edge trigger
EdgeAny – rising or falling edge

LevelHigh – active high signal
LevelLow – active low signal

AcqStartTriggerMode - Selects if the start of acquisition should be stimulated by an external hardware trigger. See the AcquisitionStart command for software triggering.

SyncIn1 – trigger at SyncIn1 to be associated with this control
SyncIn2 – trigger at SyncIn2 to be associated with this control
Disabled – an external trigger does not control start of acquisition

FrameRate

When FrameStartTriggerMode is set to FixedRate, this control specifies the frame rate.

FrameStart

Controls relating to the triggering of frames within an acquisition.

FrameStartTriggerDelay - Start-of-image is delayed FrameStartTriggerDelay microseconds after receiving an external trigger event. This feature valid only when FrameStartTriggerMode is set to external trigger (i.e. SyncIn1, SyncIn2). Useful when using a common trigger to synch with a strobe lighting source, which will inherently have some fixed setup time.

FrameStartTriggerEvent - The external trigger can be configured to accept various trigger event types:

EdgeRising – rising edge trigger
EdgeFalling – falling edge trigger
EdgeAny – rising or falling edge
LevelHigh – active high signal
LevelLow – active low signal

FrameStartTriggerMode - Determines how an image frame is initiated within an acquisition.

Freerun – camera runs at maximum supported frame rate depending on the exposure time and region of interest size.
SyncIn1 - external trigger SyncIn1
SyncIn2 - external trigger SyncIn2
FixedRate - camera self-triggers at a fixed frame rate defined by FrameRate.
Software - software initiated image capture.

FrameStartTriggerSoftware – A command. Valid when FrameStartTriggerMode equals Software. In SampleViewer, when selected a button appears at the bottom of the controls window that snaps a single image when pressed.

AcquisitionAbort – A command. In SampleViewer, when selected a button appears at the bottom of the controls window that aborts the acquisition when pressed.

AcquisitionFrameCount - Define the number of frames to capture when capturing a limited sequence of images. Used in combination with MultiFrame and Recorder acquisition modes.

AcquisitionMode

The acquisition modes, which determine how the camera handles frame triggers within the acquisition stream.

Continuous – After an acquisition start event, the camera will continuously receive frame trigger events, or in the case where FrameStartTriggerMode equals Freerun, will continuously stream. This is the normal acquisition mode of the camera.

SingleFrame - After an acquisition start event, the camera will only receive a single frame trigger event. Further trigger events will be ignored until acquisition is stopped and restarted.

MultiFrame - After an acquisition start event, the camera will receive AcquisitionFrameCount number of triggers. Further trigger events will be ignored until acquisition is stopped and restarted.

Recorder – After an acquisition start event, the camera will continuously capture images into the camera on-board memory, but will not send them to the host until an AcqRec trigger signal is received. Further AcqRec trigger events will be ignored until acquisition is stopped and restarted.

Combined with the RecorderPreEventCount control, this feature is useful for returning any number of frames **before** a trigger event.

When AcqRec trigger is received, the currently imaging/aquiring image will complete as normal, and then at least one more image will be taken. See RecorderPreEventCount.

The memory is a circular buffer, that is, once it is full starts rewriting images. Its size is determined by AcquisitionFrameCount.

AcquisitionStart – A command. In SampleViewer, when selected a dialog box appears at the bottom of the controls screen showing an AcquisitionStart button which will start the camera imaging when pressed.

AcquisitionStop - A command. In SampleViewer, when selected a dialog box appears at the bottom of the controls screen showing an AcquisitionStop button which will stop the image stream when pressed.

RecorderPreEventCount – The number of images returned before the AcqRec trigger event, with AquisitionFrameCount minus RecorderPreEventCount images being returned after the trigger event. Valid only when AcquisitionMode equals Recorder.

NOTE: at least one image must be captured after the AcqRec trigger event. That is, you cannot set RecorderPreEventCount = 1, AcquisitionFrameCount = 1.

ConfigFile

Prosilica's GigE cameras are capable of storing a number of user-specified configurations within the camera's non-volatile memory. These saved configurations can be used to define the power-up settings of the camera or to quickly switch between a number of predefined settings.

ConfigFileIndex - The index number corresponding to the configuration set that you are currently working with. Possible settings: Factory, 1, 2, 3, 4, 5.
ConfigFileLoad – A command. In SampleViewer, selecting this control will reveal a button at the bottom of the controls list that, when pressed, will load the configuration corresponding to ConfigFileIndex.
ConfigFilePowerUp - The saved configuration that will load when the camera powers up. Possible settings: Factory, 1, 2, 3, 4, 5.
ConfigFileSave - A command. In SampleViewer, selecting this control will reveal a button at the bottom of the controls list that, when pressed, will save the current camera settings into the non-volatile memory location currently indicated by ConfigFileIndex. The Factory setting cannot be overwritten.

Controls

DSP

The automatic exposure, gain, and whitebalance features can be configured to respond only to a subregion within the image scene. This feature can be used to choose a subregion that will 'meter' the rest of the image. This feature works like the region metering on a photographic camera.

DSPSubregionBottom - defines the bottom of the region in pixels. Defaults to a huge number much larger than the maximum number of sensor rows.

DSPSubregionLeft - defines the position of left edge of the DSP subregion. Measured in pixels from the left edge. Defaults to zero.

DSPSubregionRight - defines the position of the right edge of the DSP subregion as measured from the left side of the image. Defaults to a huge number much larger than the maximum number of sensor columns.

DSPSubregionTop - Defines the top edge of the DSP subregion defined as the number of pixels from the top edge of the full image. Defaults to zero.

DefectMask

This feature is only available on the GE4000 and GE4900 cameras. The standard model of these cameras use Class 2 sensors which can have column defects. The DefectMask replaces defective columns with interpolated values based on neighboring columns. Class 1 and Class 0 sensors are available for these cameras which do not require any column masking.

DefectMaskColumnEnable - The defect mask can be set to On or Off.

Exposure

Auto

This group of controls relates to the camera auto-exposure function.
NOTE: The camera must be acquiring images in order for the auto exposure algorithm to update.

ExposureAutoAdjustDelay – Currently unimplemented.
ExposureAutoAdjustTol – In percent. A threshold. Sets a range in variation from ExposureAutoTarget in which the autoexposure algorithm will not respond. Can be used to limit exposure setting changes to only larger variations in scene lighting.

ExposureAutoAlg – The following algorithms can be used to calculate auto-exposure:

Mean – The arithmetic mean of the histogram of the current image is compared to ExposureAutoTarget, and the next image adjusted in exposure time to meet this target. Bright areas are allowed to saturate.

FitRange – The histogram of the current image is measured, and the exposure time of the next image is adjusted so bright areas are not saturated. Generally, the Mean setting is preferred.

ExposureAutoMax – In microseconds. This sets the upper bound to the exposure setting in autoexposure mode. This is useful in situations where frame rate is important. This value would normally be set to something less than 1x10^6/(desired frame rate).

ExposureAutoMin - In microseconds. This sets the lower bound to the exposure setting in autoexposure mode.

ExposureAutoOutliers – In percent. The percentage of image pixels that do not have to fit into the proper exposure range.

ExposureAutoRate – In percent. Determines the rate at which the autoexposure function changes the exposure setting.

ExposureAutoTarget – In percent. Controls the general lightness or darkness of the auto exposure feature; specifically the target mean histogram level of the image, 0 being black, 100 being white.

ExposureMode

Manual - The camera exposure time is fixed by ExposureValue parameter.

Auto - The exposure time will vary continuously according to the scene illumination. The Auto exposure function operates according to the Auto and DSP controls

AutoOnce - The exposure will be set once according to the scene illumination and then remain at that setting even when the scene illumination changes. The AutoOnce exposure function operates according to the Auto and DSP controls

External - When ExposureMode is set to External the exposure time will be controlled by an external signal appearing on SyncIn1 or SyncIn2. In order for this feature to work, the parameter FrameStartTriggerMode must be set to SyncIn1 or SyncIn2. This feature is supported in version 1.36 firmware and above. It is not available on any of the CMOS-based cameras.

ExposureValue – In microseconds. The sensor integration time. 15000 corresponds to 15 ms integration time, 1000 corresponds to 1ms, etc.

Gain

Auto

This group of controls relates to the camera auto gain function.
NOTE: The camera must be acquiring images in order for the auto gain algorithm to update.

GainAutoAdjustDelay – Currently unimplemented.
GainAutoAdjustTol - In percent. A threshold. Sets a range in variation from GainAutoTarget in which the auto gain algorithm will not respond. Can be used to limit gain setting changes to only larger variations in scene lighting.

GainAutoMax – In dB. Sets the upper bound to the gain setting in Auto gain mode.

GainAutoMin – In dB. Sets the lower bound to the gain setting in Auto gain mode. Normally this number would be set to zero.

GainAutoOutliers - In percent. The percentage of image pixels that do not have to fit into the auto gain range

GainAutoRate - In percent. Determines the rate at which the auto gain function changes the gain setting.

GainAutoTarget - In percent. Controls the general lightness or darkness of the Auto gain feature. A percentage of the maximum GainValue.

GainMode

Manual - The camera gain is fixed by GainValue parameter.

Auto - The gain will vary continuously according to the scene illumination. The Auto gain function operates according to the Auto and DSP controls. Available on cameras with version 1.36 firmware and above.

AutoOnce - The gain will be set once according to the scene illumination and then remain at that setting even when the scene illumination changes. The AutoOnce gain function operates according to the Auto and DSP controls

GainValue – In dB. $G_{dB} = 20 \log_{10}(V_{in}/V_{out})$. The gain setting applied to the sensor. Default gain is zero, and gives the best image quality. However, in low light situations, it may be necessary to increase the gain setting.

Iris

All video-type auto iris lenses have a default reference voltage. When a voltage larger than this reference voltage is applied to the lens, the iris closes. When a voltage is applied less than this reference voltage, the iris opens. The auto iris algorithm calculates the appropriate voltage, IrisVideoLevel, to apply to the lens, based on the brightness of the current image vs. the IrisAutoTarget.

NOTE: The camera must be acquiring images in order for the auto iris algorithm to update.

IrisAutoTarget – In percent. Controls the general lightness or darkness of the auto iris feature; specifically the target mean histogram level of the image, 0 being black, 100 being white.

IrisMode – Sets the auto-iris mode

Disabled – Turn off the video auto-iris function.
Video – Turn on the video auto-iris function.
VideoOpen – Fully open the iris.
VideoClosed – Full close the iris.

IrisVideoLevel – In 10 mV units. This attribute reports the strength of the video signal coming from the camera.

IrisVideoLevelMax - In 10 mV units. Limits the maximum driving voltage for closing the lens iris. Typically this will be 150, however it may vary dependent on the lens reference voltage.

IrisVideoLevelMin - In 10 mV units. Limits the minimum driving voltage for opening the lens iris. Typically this will be 0.

WhiteBalance

Auto

The following parameters are used to control the way that the Auto whitebalance function operates.

WhitebalAutoAdjustDelay - Currently unimplemented.
WhitebalAutoAdjustTol - A threshold. This parameter sets a range of scene color changes in which the automatic whitebalance will not respond. This parameter can be used to limit whitebalance setting changes to only larger variations in scene color.

WhitebalAutoAlg - The whitebalance algorithm is fixed as "Mean", that is, the algorithm uses the mean histogram value for the red and blue channels in its calculations.

WhitebalAutoRate - In percent. Determines how fast the Auto Whitebalance updates.

WhitebalMode

Manual – Auto whitebalance is off. Whitebalance can be adjusted directly by changing the WhitebalValueRed and WhitebalValueBlue parameters.

Auto - Whitebalance will continuously adjust according to the current scene. The Auto function operates according to the Auto and DSP controls

AutoOnce – A command (of type Enumeration in PvAPI). A single iteration of the auto whitebalance algorithm is run, and then the camera reverts to Manual WhitebalMode. The AutoOnce function operates according to the Auto and DSP controls

WhitebalValueRed – Red gain expressed as a percentage of the camera default setting.

WhitebalValueBlue - Blue gain expressed as a percentage of the camera default setting.

GigE

BandwidthCtrlMode

StreamBytesPerSecond - The default mode of bandwidth control. See the StreamBytesPerSecond control for more information.

SCPD - Stream channel packet delay expressed in timestamp counter units. This mode is not recommended.

Both - Implements a combination of control modes. This mode is not recommended

Ethernet

DeviceEthAddress - The physical MAC address of the camera

HostEthAddress - The physical MAC address of the host network card

IP

DeviceEthAddress - The current IP address of the camera

HostEthAddress - The current IP address of the host network interface.

GvcpRetries - The maximum number of resend requests that the host will attempt when trying to recover a lost packet.

HeartbeatInterval – In milliseconds. The interval at which the API sends a heartbeat command to the camera. Normally this parameter does not require adjustment.

HeartbeatTimeout - In milliseconds. The maximum amount of time the camera will wait for a heartbeat command before timing out.

NOTE: this value may need to be increased when using breakpoints in your API code. Breakpoints stall the API from sending heartbeat commands, which may cause the camera to time out.

Multicast

Multicast mode allows the camera to send image data to all hosts on the same subnet as the camera. The host computer (or SampleViewer application instance) that first enables multicast mode is the *master*, and controls all camera parameters. All other hosts / instances are the *monitors*, and can view image data only.

NOTE: Most GigE switches support a maximum PacketSize of 1500 in Multicast mode.

MulticastEnable - Enables Multicast mode. The live view window must be closed to enable this control.

MulticastIPAddress - The multicast IP address can be set using this control.

PacketSize – In Bytes. Determines the Ethernet packet size. Generally speaking this number should be set to as large as the network adaptor will allow. If this number is reduced, then CPU loading will increase. These large packet sizes are called Jumbo Packets/Frames in Ethernet terminology. If your GigE network adaptor does not support Jumbo Packets/Frames of at least 8228 Bytes (the camera default on power up), then you will need to reduce PacketSize parameter to match the maximum supported by your network adaptor.

A PacketSize of 1500 is a safe setting which all GigEthernet network cards support.

NOTE: If you are seeing **all** "black images", or **all** frames reported as StatFramesDropped and **zero** images reported as StatFramesCompleted, you will likely need to decrease this parameter.

StreamBytesPerSecond – In Bytes/Sec. Used to moderate the data rate of the camera. This is particularly useful for slowing the camera down so that it can operate over slower links such as Fast Ethernet (100-speed), or wireless networks. It is also an important control for multi-camera situations. When multiple cameras are connected to a single Gigabit Ethernet port (usually through a switch), StreamBytesPerSecond for each camera needs to be set to a value so that the sum of each camera's StreamBytesPerSecond parameter does not exceed the data rate of the GigE port. Setting the parameter in this way will ensure that multiple camera situations work without packet collisions, i.e. data loss.

115,000,000 is the typical data maximum data rate for a GigE port.

To calculate the required minimum StreamByetsPerSecond setting for a camera in any image mode, use the following formula:

Height x **Width** x **FrameRate** x **Bytes per Pixel** (see **ImageFormat**)

NOTE: If you are seeing **occasional** "black images", or **occasional** frames/packets reported as StatFramesDropped/StatPacketsDropped you will likely need to decrease this parameter.

StreamHold

For controlling when the camera sends data to the host computer. Normally the camera sends data to the host computer immediately after completion of exposure. Enabling StreamHold delays the transmission of data, storing it in on-camera memory, until StreamHold is disabled.

This feature can be useful to prevent GigE network flooding in situations where a large number of cameras connected to a single host computer are capturing a single event. Using the StreamHold function, each camera will hold the event image data until the host computer disables StreamHold for each camera in turn.

StreamHoldCapacity - Read only. The total number of image frames that can be stored in the camera memory. Dependent on the camera internal memory size and TotalBytesPerFrame.

StreamHoldEnable - Enables StreamHold functionality. When disabled, the image data will be released to the host computer.

ImageFormat

ROI - Region of Interest. Defines a rectangular sub-region of the image. Selecting an ROI that is small can increase the maximum frame rate and reduce the amount of image data. The following parameters define the size and location of the ROI sub-region:

Height - In rows. The vertical size of the rectangle that defines the ROI.
RegionX - In pixels. The X position of the top-left corner of the ROI
RegionY - In pixels. The Y position of the top-left corner of the ROI
Width - In columns. The horizontal size of the rectangle that defines the ROI.

PixelFormat - The various pixel data formats the camera can output. Not all cameras have every mode:

Mono8 – 8 bits per pixel, monochrome. On camera interpolation, with luminance (Y) channel returned. For 10 bit (CMOS) or 12 bit (CCD) sensors, the most significant 8 bits are returned.
Mono16 - 16 bits per pixel, monochrome. On camera interpolation, with luminance (Y) channel returned. For 10 bit (CMOS) or 12 bit (CCD) sensors, the data is least significant bit aligned within the 16 bit word. That is: 0000xxxx xxxxxxxx.
Bayer8 – 8 bits per pixel, raw un-interpolated data from camera. SampleViewer interpolates the data in software. For 10 bit (CMOS) or 12 bit (CCD) sensors, the most significant 8 bits are returned.
Bayer16 – 16 bits per pixel, raw un-interpolated data from camera. SampleViewer interpolates the data in software. For 10 bit (CMOS) or 12 bit (CCD) sensors, the data is least significant bit aligned within the 16 bit word. That is: 0000xxxx xxxxxxxx.
RGB24 – 24 bits per pixel, on-camera interpolated color.
YUV411 – 12 bits per pixel, on-camera interpolated color.
YUV422 – 16 bits per pixel, on-camera interpolated color.
YUV444 – 24 bits per pixel, on-camera interpolated color.
BGR24 – 24 bits per pixel, on-camera interpolated color.
RGBA24 – 24 bits per pixel, support for post overlay, on-camera interpolated color.

TotalBytesPerFrame – Read only. The total number of bytes per image frame. Dependant on ROI, PixelFormat, and Binning.

ImageMode

Binning is the summing of charge of adjacent pixels on a sensor, to give a lower resolution but more sensitive image.

BinningX – The horizontal binning factor.
BinningY – The vertical binning factor. In most cases BinningX and BinningY would be set to equal values.

Info

CameraName – Read/Write. The camera name can be modified by the user using the SampleViewer or PvAPI.

Firmware

Read only. What firmware is currently loaded on the camera.

FirmwareVerBuild – Build information
FirmwareVerMinor – The minor part of Firmware version number (part after the decimal)
FirmwareVerMajor – The major part of the Firmware version number (part before the decimal)

ModelName - The camera model.

Part

When quoting the serial number to AVT Canada Inc, use the PartNumber - PartVersion - SerialNumber format, ie. 2201A-060512.

PartNumber – Camera part number.Prosilica part number for the camera model.
PartRevision – Camera revision. Part number revision level
PartVersion – Camera version. Part number version level
SerialNumber – Camera serial number.

Sensor

SensorBits - The sensor digitization bit depth.
SensorHeight - The total number of pixel rows on the sensor.
SensorType - Monochrome or Bayer-pattern color sensor type.
SensorWidth – The total number of pixel columns on the sensor.

TimeStampFrequency – In Hz. All images returned from the camera are marked with a timestamp. TimeStampFrequency is the time base for the Timestamp function. The image timestamp can be useful for determining whether images are missing from a sequence due to missing trigger events.

UniqueID – Read only. The unique camera ID that differentiates the current camera from all other cameras.

IO

The control and readout of all camera inputs and outputs. The number of inputs and outputs will depend on your camera model.

Strobe

Valid when any of the SyncOut modes are set to Strobe1. Strobe allows the added functionality of duration and delay, useful when trying to sync a camera exposure to an external strobe.

1

Strobe1ControlledDuration – When enabled, the Strobe1Duration control is valid.
Strobe1Delay – In microseconds. Delay of start of strobe signal.
Strobe1Duration - In microseconds. Duration of strobe signal.
Strobe1Mode – associates the start of strobe signal with one of the following image capture signals:

AcquisitionTriggerReady – Active once the camera has been recognized by the host PC and is ready to start acquisition.
FrameTriggerReady – Active when the camera is in a state that will accept the next frame trigger.
FrameTrigger – Active when an image has been initiated to start. This is a logic trigger internal to the camera, which is initiated by an external trigger or software trigger event.
Exposing – Active for the duration of sensor exposure.
FrameReadout – Active at during frame readout, i.e. the transferring of image data from the CCD to camera memory.
Imaging – Active during exposure and readout.
Acquiring – Active during an acquisition stream.
SyncIn1 – Active when there is an external trigger at syncIn1
SyncIn2 – Active when there is an external trigger at syncIn2

NOTE: Please refer to camera waveform diagrams provided in the camera manuals for more detail information.

SyncIn

SyncInLevels – Read only. A four bit register, each bit corresponding to a specific SyncIn input. For example: 2 equals (0010) which means SyncIn2 is high and all other Sync input signals are low.

SyncOut

Controls the camera outputs. Can be used for synchronization with other cameras/devices or general purpose outputs.

1 - Settings specific to SyncOut1

SyncOut1Invert - When enabled, reverses the polarity of the signal output by SyncOut1.
SyncOut1Mode - determines the type of output defined by SyncOut1:

GPO – configured to be a general purpose output, control of which is assigned to SyncOutGpoLevels
AcquisitionTriggerReady – Active once the camera has been recognized by the host PC and is ready to start acquisition.
FrameTriggerReady – Active when the camera is in a state that will accept the next frame trigger.

FrameTrigger – Active when an image has been initiated to start. This is a logic trigger internal to the camera, which is initiated by an external trigger or software trigger event.
Exposing – Active for the duration of sensor exposure.
FrameReadout – Active at during frame readout, i.e. the transferring of image data from the CCD to camera memory.
Acquiring – Active during a acquisition stream.
SyncIn1 – Active when there is an external trigger at syncIn1
SyncIn2 – Active when there is an external trigger at syncIn2
Strobe1 – The output signal is controlled according to Strobe1 settings.

NOTE: Refer to camera waveform diagrams for more detailed information.

2 - Settings specific to SyncOut2 (definitions same as above)

3 - Settings specific to SyncOut3 (definitions same as above)

Stats

StatDriverType - There are two main types of drivers currently available for use with Prosilica's cameras: Standard, and Filter. Using the Filter driver will reduce the load on the host CPU. If this value shows "Filter", the filter driver is installed and is being used. If it reports "Standard", then the filter driver is not installed, or is not activated.

StatFilterVersion - Version of the filter driver being used.

StatFrameRate - The current actual frame rate of the camera as received by the driver.

StatFramesCompleted - The number of frames captured since the start of imaging.

StatFramesDropped - The number of frames dropped during transmission since the start of imaging.

NOTE: If everything is configured correctly, this number should be zero. See StreamBytesPerSecond, PacketSize, and refer to the Host Computer Optimizations note.

StatPacketsErroneous – The number of improperly formed packets. If this number is non-zero, it suggests a possible camera hardware failure.

StatPacketsMissed - The number of packets missed since the start of imaging.

NOTE: If everything is configured correctly, this number should remain zero, or at least very low compared to StatPacketsReceived. See StreamBytesPerSecond, PacketSize, and refer to Host Computer Optimizations note.

StatPacketsReceived - The number of packets received by the driver since the start of imaging.

StatPacketsRequested – The number of resend requests since the start of imaging. When an expected packet is not received by the driver, it is recognized as missing and the driver requests the camera to resend it.

StatPacketsResent - The number of packets resent by the camera since the start of imaging.